

CLAIMS

1. A tube rack, comprising:

a base having an array of openings extending vertically therebetween, said openings being configured and dimensioned to receive a plurality of tubes, with upper ends of the tubes being accessible at said top surface, wherein said base includes sidewalls that each include a co-axial trunnion extending from said associated sidewall; and

a rotatable and removable cover having a front wall, a back wall, first and second cover sidewalls and a top surface, said first and second cover sidewalls each include an associated notch open on a bottom surface thereof to allow said cover to be lowered onto said base, such that each of said notches rests on its associated said trunnion and may be (i) vertically raised from its closed position on said trunnions or (ii) rotated about said trunnions between its closed position and a full open position to allow access to said array of openings, wherein each of said notches includes a trunnion travel surface and a ledge surface, wherein said ledge surface engages its associated trunnion to limit rotation of said cover beyond said full open position.

2. The tube rack of claim 1, wherein each of said openings comprises a plurality of support pads positioned within said opening to vertically support the tube within its associated said opening, wherein said pads comprise a surface that supportably engages the tube, while providing flow paths adjacent to the tube through which air may pass.

5/3/17 1 3. The tube rack of claim 2, wherein said surface comprises a chamfered concave surface.

1 4. The tube rack of claim 3, wherein said openings are substantially rectangular and each wall
2 of said opening includes one of said support pads.

1 5. The tube rack of claim 3, wherein said openings are substantially rectangular and at least
2 two of said facing walls includes one of said support pads.

1 6. The tube rack of claim 4, wherein said top surface is transparent.

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1 7. The tube rack of claim 1, further comprising
2 a plurality of projecting support pads positioned within said opening closer to said bottom
3 surface than to said top surface and integral with its associate opening sidewall, to vertically
4 support the tube within its associated said opening, wherein said pads comprise a chamfered
5 concave surface that supportably engages the tube.

1 8. The tube rack of claim 7, wherein said projecting support pads are positioned within said
2 openings to allow flow paths extending between said top and bottom surfaces through which air
3 may pass adjacent to the tube between said top and bottom surfaces.

1 9. The tube rack of claim 7, said projecting support pads are symmetrically positioned within
2 said openings such that each of said projecting support pads has an associated opposing projecting
3 support pads, while allowing flow paths extending between said top and bottom surfaces through
4 which air may pass between said top and bottom surfaces adjacent to a tube within the opening.

1 10. The tube rack of claim 1, further comprising:

2 first and second slide latches each having a lengthwise tongue; and
3 wherein said base comprises first and second base sidewalls that each include a slide surface
4 comprising a lengthwise groove that slidably mates with one of said lengthwise tongues of an
5 associated one of said slide latches, such that each of said slide latches moves lengthwise over its
6 associated said slide surface between latched and unlatched positions.

1 11. The tube rack of claim 10, wherein each of said slide latches comprises:

2 a main body including a top surface having a top projection and an inner sidewall having
3 first and second sidewall projections, wherein said top projection acts to prevent said associated
4 slide latch from being withdrawn too far with respect to its associated said slide surface, and said
5 first and second sidewall projections assist in maintaining their associated said slide latch in its
6 open or closed position.



1 12. The tube rack of claim 11, wherein said slide latches each include a finger that extends
2 lengthwise from said main body to prevent said cover from being removed from said base when
3 said latch is in its closed position.

1 13. The tube rack of claim 12, wherein said cover includes first and second bosses located on
2 an interior portion of said cover, said bosses each include a finger passage through which an
3 associated one of said fingers passes to lock the cover in the closed position.

1 14. The tube rack of claim 13, wherein said bosses form an integral unitary structure with said
2 first and second cover sidewalls.

15. The tube rack of claim 14, wherein each of said bosses includes an associated boss support
surface that rests on an associated base support surface when said cover is in the full closed
position.

16. A test tube rack, comprising:

2 a base having an array of openings extending therebetween, said openings being configured
3 to receive a plurality of tubes, with upper ends of the tubes being accessible at said top surface,
4 wherein said base includes sidewalls that each include a co-axial trunnion extending from said
5 associated sidewall, each of said openings comprises a plurality of support pads positioned within
6 said opening to vertically support the tube within its associated said opening, wherein said pads

comprise a chamfered concave surface that supportably engages the tube, while providing flow paths adjacent to the tube through which air may pass;

a rotatable and removable cover having a front wall, a back wall, first and second cover sidewalls and a top surface, said first and second cover sidewalls each include an associated notch open on a bottom surface thereof to allow said cover to be lowered onto said base, such that each of said notches rests on its associated said trunnion and may be (i) vertically raised from its closed position on said trunnions or (ii) rotated about said trunnions between its closed position and a full open position to allow access to said array of openings, wherein each of said notches includes a trunnion travel surface and a ledge surface, wherein said ledge surface engages its associated trunnion to limit rotation of said cover beyond said full open position;

first and second slide latches each having a lengthwise tongue; and wherein said base comprises first and second base sidewalls that each include a slide surface comprising a lengthwise groove that slidably mates with one of said lengthwise tongues of an associated one of said slide latches, such that each of said slide latches moves lengthwise over its associated said slide surface between latched and unlatched positions.

17. The test tube rack of claim 16, wherein said support pads are symmetrically positioned within said openings such that each of said support pads has an associated opposing said support pad while allowing flow paths extending between said top and bottom surfaces through which air may pass between said top and bottom surfaces adjacent to a tube within the opening.

1 18. The test tube rack of claim 17, wherein said cover and base are different color shades to
2 allow a machine vision device to distinguish between said cover and said base.

1 19. The test tube rack of claim 17, wherein said cover, said latches and base are different color
2 shades to allow a machine vision device to distinguish between said cover, said base and said
3 latches.

1 20. A test tube rack, comprising:
2 a base having an array of vertical openings extending therebetween, said openings being
3 configured to receive a plurality of tubes, with upper ends of the tubes being accessible at said top
4 surface, wherein said base includes sidewalls, and each of said openings comprises means for
5 supporting the tube within its associated said opening while providing flow paths adjacent to the
6 tube through which air may pass;

7 a cover having a front wall, a back wall, first and second cover sidewalls and a top
8 surface, wherein said cover rotatably mates with said base such that said cover may be rotated
9 between open and closed positions;

10 first and second slide latches each having a lengthwise tongue; and

11 wherein said base comprises first and second base sidewalls that each include a slide
12 surface comprising a lengthwise groove that slidably mates with one of said lengthwise tongues
13 of an associated one of said slide latches, such that each of said slide latches moves lengthwise
14 over its associated said slide surface between a latched position that prevents said cover from being



15 rotated from the closed position to the open position, and a latched position that allows said cover
16 to be rotated from the closed position to the open position.

1 21. The test tube rack of claim 20, wherein each of said latches comprises a top surface having
2 a projection that provides said detent so said latch is not withdrawn from said base unless a force
3 in excess of a predetermined amount is used.

1 22. The test tube rack of claim 21, wherein each of said latches includes a sidewall comprising
2 (i) a first projection that maintains said latch in its open position ensuring that said latch does not
3 slide inward in the absence of sufficient force applied by a user or automated handling equipment,
4 and (ii) a second projection that maintains said latch in its closed position ensuring that said latch
5 does not slide outward in the absence of the requisite amount of withdrawal force by the user or
6 automated handling equipment.

1 23. The test tube rack of claim 22, wherein each of said latches comprises a main body and a
2 finger that projects lengthwise from said main body.

1 24. The test tube rack of claim 23, wherein said cover includes a first boss along the interior
2 of said first cover sidewall and a second boss along the interior of said second cover sidewall, said
3 first and second bosses include first and second boss support surfaces respectively that rest on base
4 support surfaces.

